EX1048

48-CHANNEL, PRECISION THERMOCOUPLE INSTRUMENT

QUICK START GUIDE

P/N: 82-0105-003
Released February 6, 2009

VTI Instruments Corp.

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CERTIFICATION

VTI Instruments Corp. (VTI) certifies that this product met its published specifications at the time of shipment from the factory. VTI further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (formerly National Bureau of Standards), to the extent allowed by that organization's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

The product referred to herein is warranted against defects in material and workmanship for a period of one year from the receipt date of the product at customer's facility. The sole and exclusive remedy for breach of any warranty concerning these goods shall be repair or replacement of defective parts, or a refund of the purchase price, to be determined at the option of VTI.

For warranty service or repair, this product must be returned to a VTI Instruments authorized service center. The product shall be shipped prepaid to VTI and VTI shall prepay all returns of the product to the buyer. However, the buyer shall pay all shipping charges, duties, and taxes for products returned to VTI from another country.

VTI warrants that its software and firmware designated by VTI for use with a product will execute its programming when properly installed on that product. VTI does not however warrant that the operation of the product, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The warranty shall not apply to defects resulting from improper or inadequate maintenance by the buyer, buyer-supplied products or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

VTI Instruments Corp. shall not be liable for injury to property other than the goods themselves. Other than the limited warranty stated above, VTI Instruments Corp. makes no other warranties, express or implied, with respect to the quality of product beyond the description of the goods on the face of the contract. VTI specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subdivision (b)(3)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013.

VTI Instruments Corp.
2031 Main Street
Irvine, CA 92614-6509 U.S.A.

DECLARATION OF CONFORMITY

Declaration of Conformity According to ISO/IEC Guide 22 and EN 45014

MANUFACTURER'S NAME	VTI Instruments Corp.
MANUFACTURER'S ADDRESS	2031 Main Street Irvine, California 92614-6509
PRODUCT NAME	48-channel, Temperature Measurement Instrument
MODEL NUMBER(S)	EX1048
PRODUCT OPTIONS	All
PRODUCT CONFIGURATIONS	All

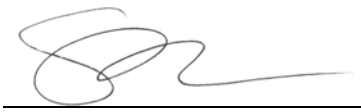
VTI Instruments Corp. declares that the aforementioned product conforms to the requirements of the Low Voltage Directive 73/23/EEC *and the* EMC Directive 89/366/EEC *(inclusive* 93/68/EEC*) and carries the "CE" mark accordingly. The product has been designed and manufactured according to the following specifications:*

SAFETY	EN61010 (2001)
EMC	EN61326 (1997 w/A1:98) Class A CISPR 22 (1997) Class A VCCI (April 2000) Class A ICES-003 Class A (ANSI C63.4 1992) AS/NZS 3548 (w/A1 & A2:97) Class A FCC Part 15 Subpart B Class A EN 61010-1:2001

I hereby declare that the aforementioned product has been designed to be in compliance with the relevant sections of the specifications listed above as well as complying with all essential requirements of the Low Voltage Directive.

February 2007

CE



Steve Mauga, QA Manager

GENERAL SAFETY INSTRUCTIONS

Review the following safety precautions to avoid bodily injury and/or damage to the product. These precautions must be observed during all phases of operation or service of this product. Failure to comply with these precautions, or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture, and intended use of the product.

Service should only be performed by qualified personnel.

TERMS AND SYMBOLS

These terms may appear in this manual:

WARNING Indicates that a procedure or condition may cause bodily injury or death.

CAUTION Indicates that a procedure or condition could possibly cause damage to equipment or loss of data.

These symbols may appear on the product:

ATTENTION - Important safety instructions

Frame or chassis ground

Indicates that the product was manufactured after August 13, 2005. This mark is placed in accordance with *EN 50419, Marking of electrical and electronic equipment in accordance with Article 11(2) of Directive 2002/96/EC (WEEE).* End-of-life product can be returned to VTI by obtaining an RMA number. Fees for take-back and recycling will apply if not prohibited by national law.

WARNINGS

Follow these precautions to avoid injury or damage to the product:

Use Proper Power Cord To avoid hazard, only use the power cord specified for this product.

Use Proper Power Source To avoid electrical overload, electric shock, or fire hazard, do not use a power source that applies other than the specified voltage.

Use Proper Fuse To avoid fire hazard, only use the type and rating fuse specified for this product.

WARNINGS (CONT.)

Avoid Electric Shock

To avoid electric shock or fire hazard, do not operate this product with the covers removed. Do not connect or disconnect any cable, probes, test leads, etc. while they are connected to a voltage source. Remove all power and unplug unit before performing any service. ***Service should only be performed by qualified personnel.***

Ground the Product

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground.

Operating Conditions

To avoid injury, electric shock or fire hazard:

- Do not operate in wet or damp conditions.
- Do not operate in an explosive atmosphere.
- Operate or store only in specified temperature range.
- Provide proper clearance for product ventilation to prevent overheating.
- DO NOT operate if any damage to this product is suspected. ***Product should be inspected or serviced only by qualified personnel.***

Improper Use

The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.
Conformity is checked by inspection.

SUPPORT RESOURCES

Support resources for this product are available on the Internet and at VTI Instruments customer support centers.

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Visit http://www.vtiinstruments.com for worldwide support sites and service plan information.

SECTION 1

OVERVIEW

INTRODUCTION

For the purposes of this discussion, the basic configuration described in the following section assumes that the EX1048 is connected directly to a portable or desktop computer (see Figure 1-1).

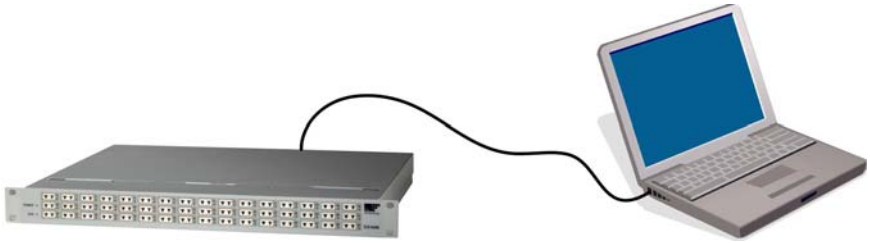

FIGURE 1-1: EX1048 SETUP

BASIC NETWORK CONFIGURATION

1) Ensure that the computer is configured to obtain a network IP address automatically. PCs using Windows XP can use the following process to ensure that Auto IP is set correctly.

   a) Click **Start → Settings → Network Connections** (see Figure 1-2).

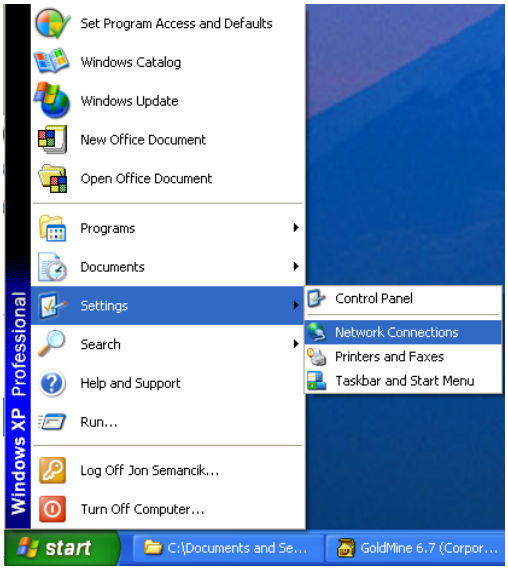

FIGURE 1-2: NETWORK CONNECTIONS SHORTCUT

b) Click **Local Area Connection → General → Properties** (see Figure 1-3).

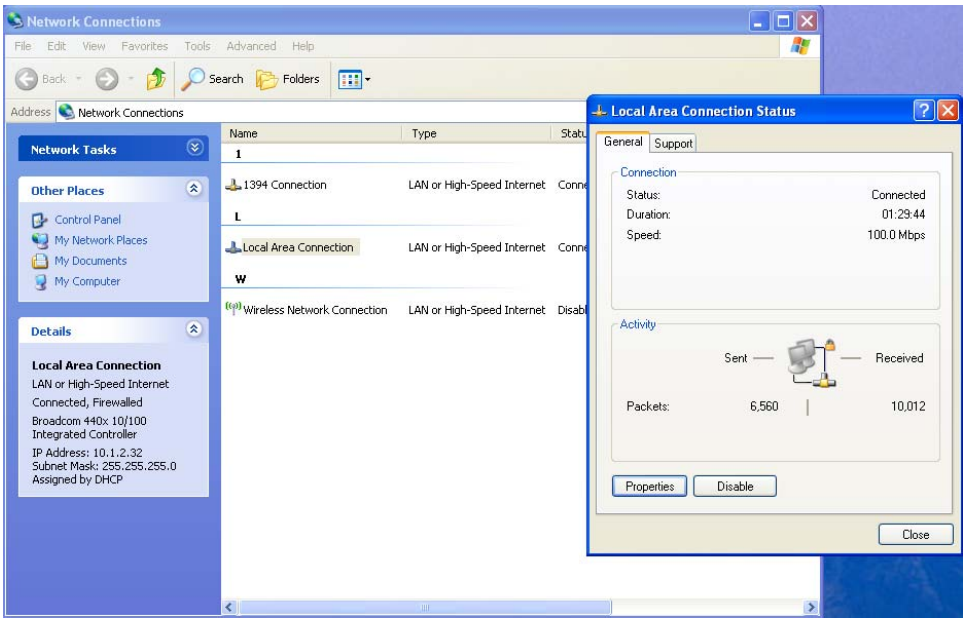

FIGURE 1-3: LOCAL AREA CONNECTION DIALOGUE BOX

c) Click **General → Internet Protocol (TCP/IP) → Properties** (see Figure 1-4).

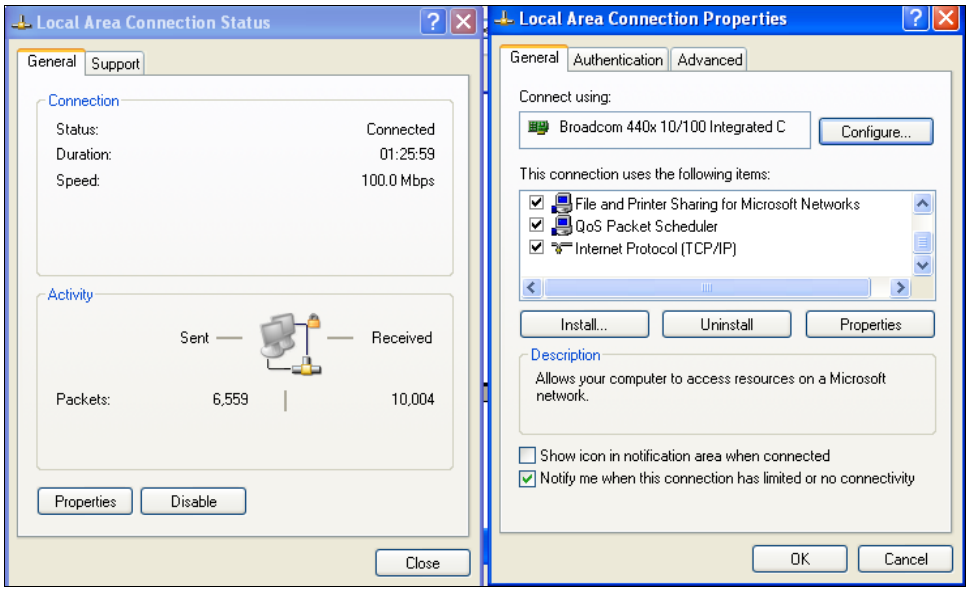

FIGURE 1-4: LOCAL AREA CONNECTION PROPERTIES DIALOGUE BOX

d) Select **Obtain an IP address automatically**.

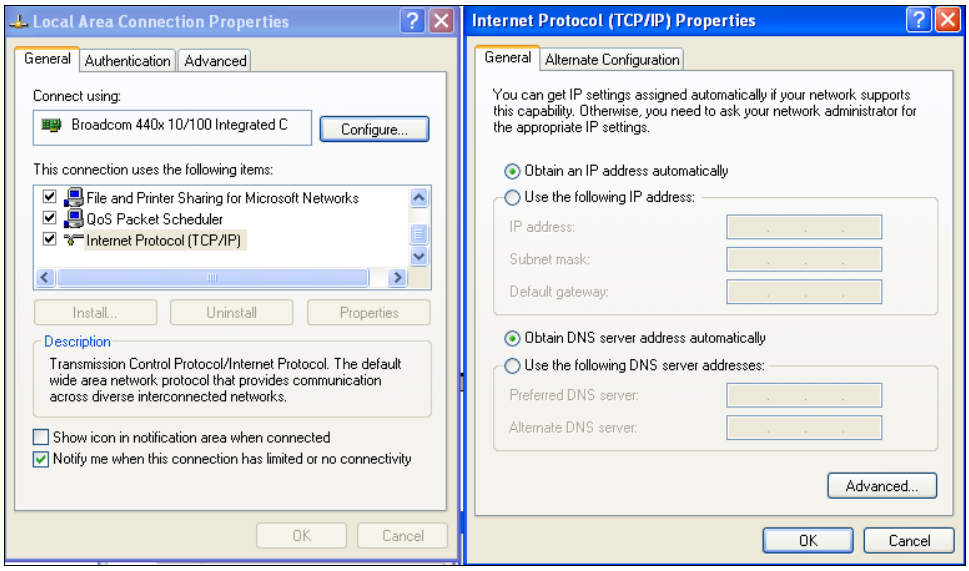
Local Area Connection Properties
General
Authentication
Advanced
Connect using:
Broadcom 440x 10/100 Integrated C
Configure...
This connection uses the following items:
File and Printer Sharing for Microsoft Networks
QoS Packet Scheduler
Internet Protocol (TCP/IP)
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in notification area when connected
Notify me when this connection has limited or no connectivity
OK
Cancel
Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

FIGURE 1-5: INTERNET PROTOCOL PROPERTIES DIALOGUE BOX

e) Click **OK** on all windows opened during this process to proceed (see Figure 1-5).

CONNECTING THE EX1048

1) Shut down both the computer and the EX1048 (see Figure 1-6).

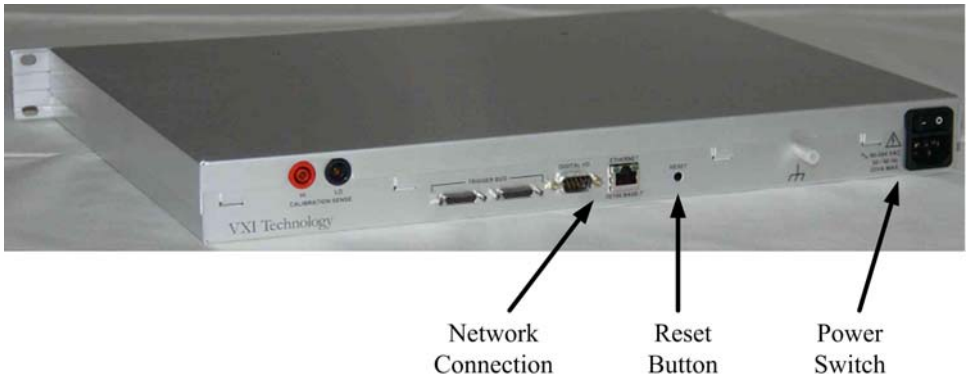

FIGURE 1-6: EX1048 (REAR VIEW)

2) Connect a standard network cable (Cat 5e) between the computer and the EX1048. (Note: a crossover cable is not required because the EX1048 is auto-MDIX capable.)

3) Turn on the computer. Wait approximately 2 minutes.

4) Turn on the EX1048. Wait approximately 2 minutes.

DETERMINING THE EX1048 TCP/IP ADDRESS

1) The rear panel of the EX1048 will have a label which contains the following information: the part number, serial number, and the Ethernet interface hardware MAC address of the module. The MAC address is used to determine the default TCP/IP address.

2) Reference the label on the rear of the unit and note the MAC address.

3) The first characters (from the right and before the first colon) identify the default TCP/IP address referenced in hexadecimal characters.

   a) The first three positions will typically default to ***169.254.x***.

   b) The final ("***x***") position is shown in Table 1-1 which shows three MAC addresses and their corresponding, default Auto IP addresses: $1_{16} = 1_{10}$, $18_{16} = 24_{10}$, and $79_{16} = 121_{10}$.

MAC Address	Auto IP Default Address
00:0D:3F:01:00:**01**	169.254.1.**1**
00:0D:3F:01:01:**18**	169.254.1.**24**
00:0D:3F:01:01:**79**	169.254.1.**121**

TABLE 1-1: SAMPLE AUTO IP ADDRESSES

VERIFYING NETWORK COMMUNICATIONS

1) Open a web browser (see Figure 1-7).

FIGURE 1-7: WEB BROWSER SCREEN SHOT

2) Type the TCI/IP address obtained in the **Determining the EX1048 TCP/IP Address** section in the browser address field. Press **Enter**. The EX1048 main web page will be displayed (see Figure 1-8).

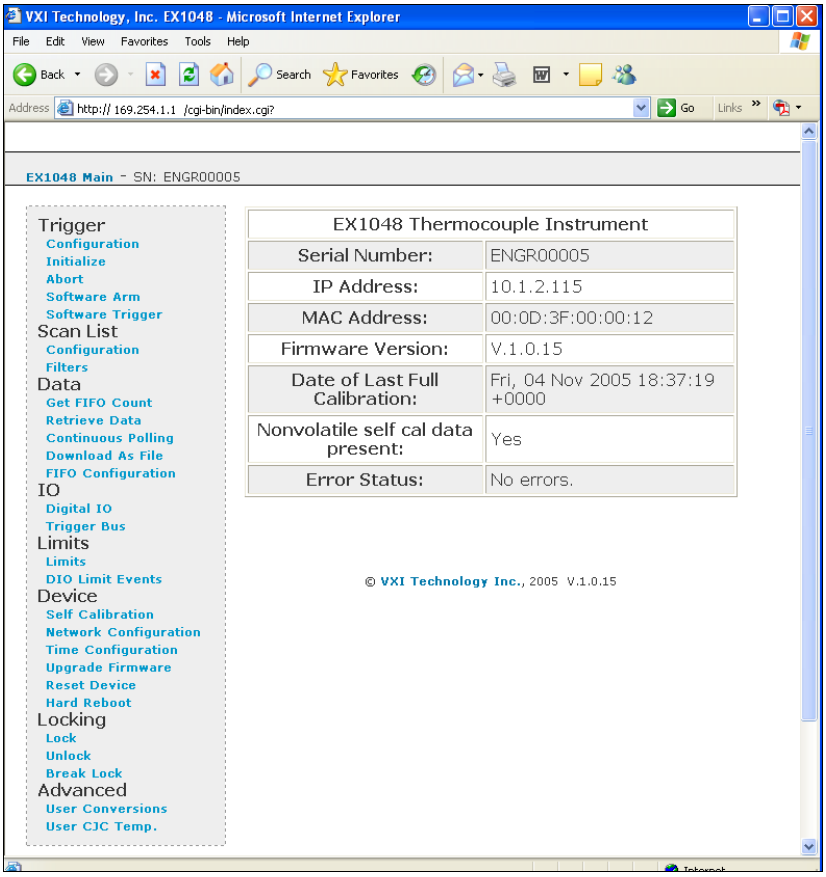

FIGURE 1-8: EX1048 MAIN WEB PAGE

3) If the EX1048 can not be located, it may be necessary to restore the unit to factory default conditions. If this is the case, use the following procedure:

   a) Power off the EX1048. Wait approximately 60 seconds before proceeding

   b) Press and hold the Reset button located on the rear panel.

   c) Power on the EX1048. Continue to hold the Reset button for at least 30 seconds.

   d) Release the reset button.

   e) Cycle power on the EX1048.

   f) Return to the beginning of the **Verifying Network Communications** section and repeat steps 1 and 2.

SECTION 2

CONNECTION EXPERT CONFIGURATION

OVERVIEW

The contents of this section will describe how to configure the EX1048 within Agilent® Connection Expert™. In the example provided, the EX1048's IP address is 10.1.2.115.

INSTALLING / INITIALIZING AGILENT CONNECTION EXPERT

1) Install the Agilent IO Library suite found on the distribution CD provided with the EX1048.

2) Launch Agilent Connection Expert once the Agilent IO Library has been installed by clicking on **Start** → (All) **Programs** → **Agilent I/O Library** → **Agilent Connection Expert**.

3) Select **LAN (TCPIP0)** and then click **"Add Instrument"** (See Figure 2-1).

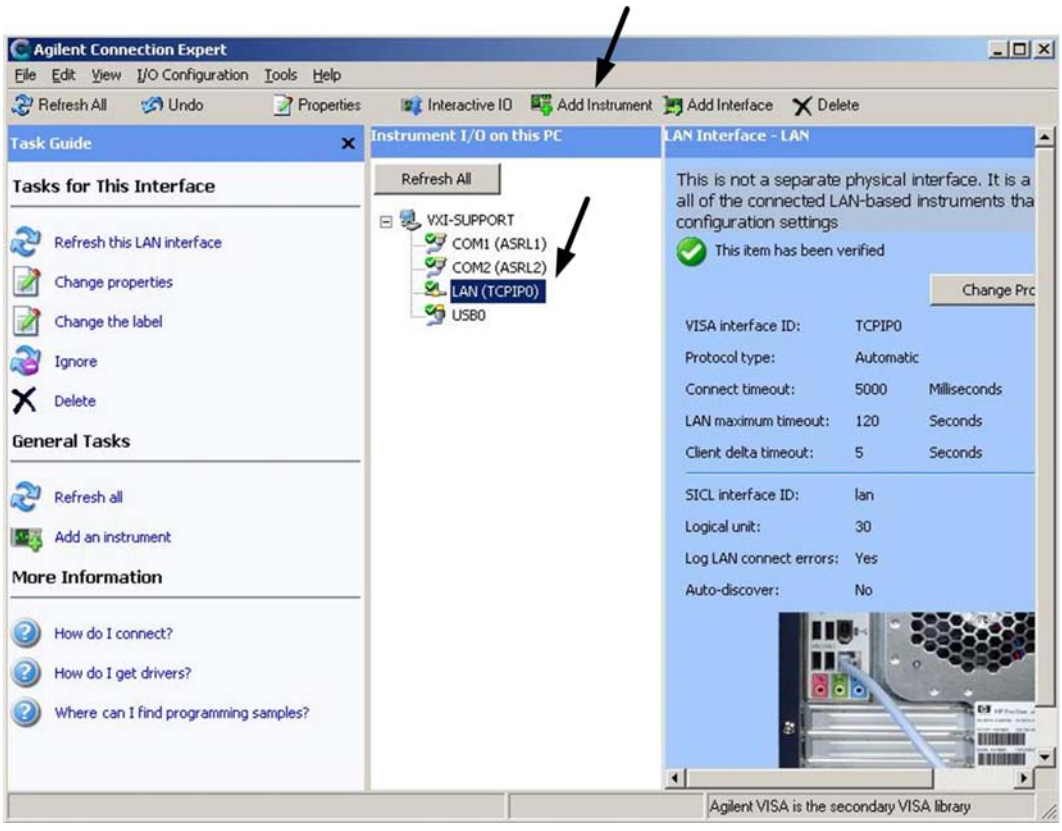

FIGURE 2-1: AGILENT CONNECTION EXPERT MAIN WINDOW

4) Select the **LAN (TCPIP0)** instrument interface and then click on the **OK** button (see Figure 2-2).

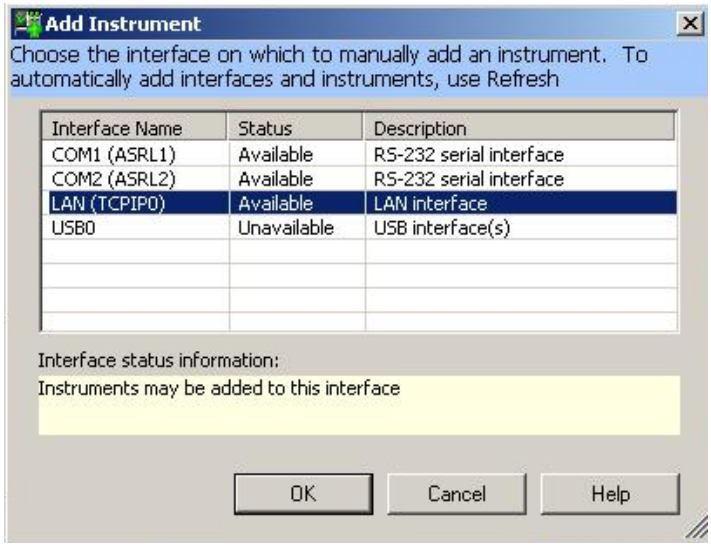

FIGURE 2-2: ADD INSTRUMENT DIALOGUE BOX

5) Next, click on the **Find Instruments…** button (see Figure 2-3).

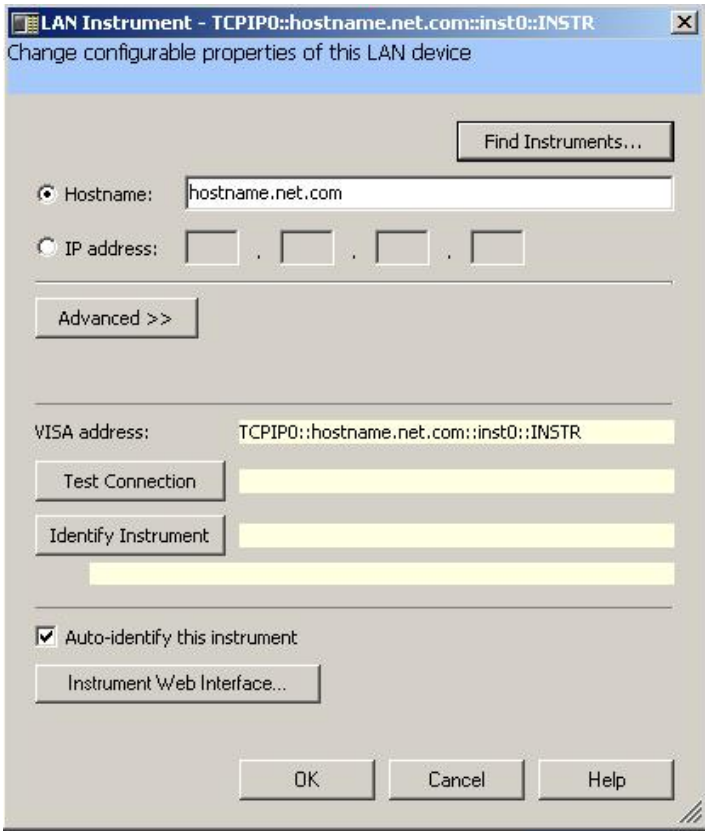

FIGURE 2-3: LAN INSTRUMENT DIALOG BOX

6) Next, select the **LAN** check box, then click on the **Find Now** button (see Figure 2-4).

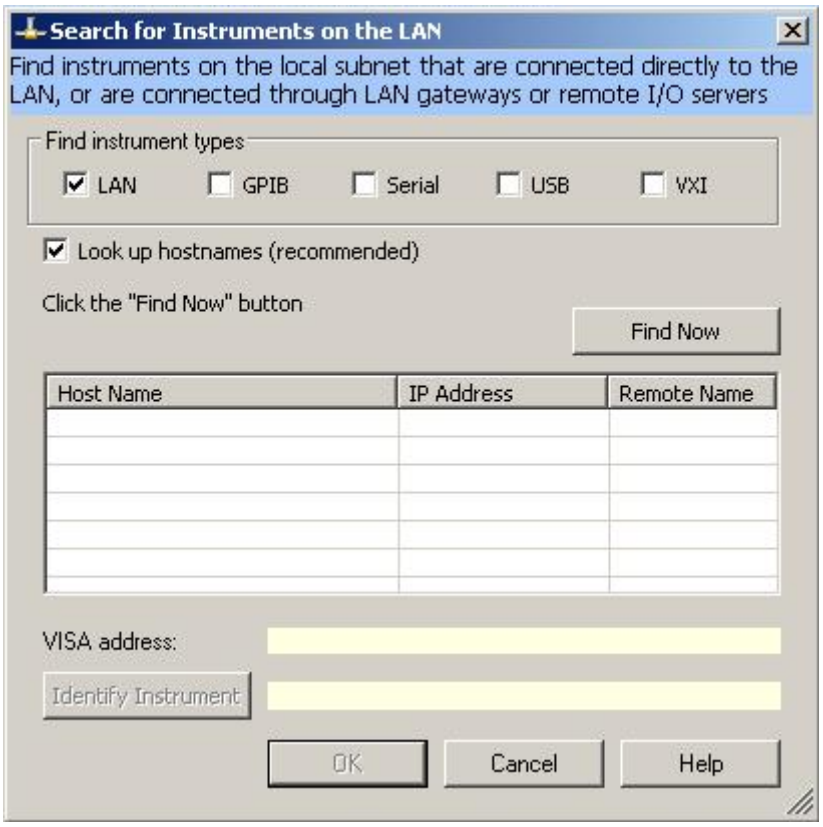

FIGURE 2-4: SEARCH FOR INSTRUMENTS ON THE LAN DIALOGUE BOX

7) Connection Expert will search the network for available instruments (see Figure 2-5).

Searching for instruments on the LAN
Creating a list of host names from IP addresses
Getting host name for 10.1.2.136
Cancel

FIGURE 2-5: CONNECTION EXPERT SEARCH DIALOGUE BOX

8) Double click on the instrument of interest (see Figure 2-6).

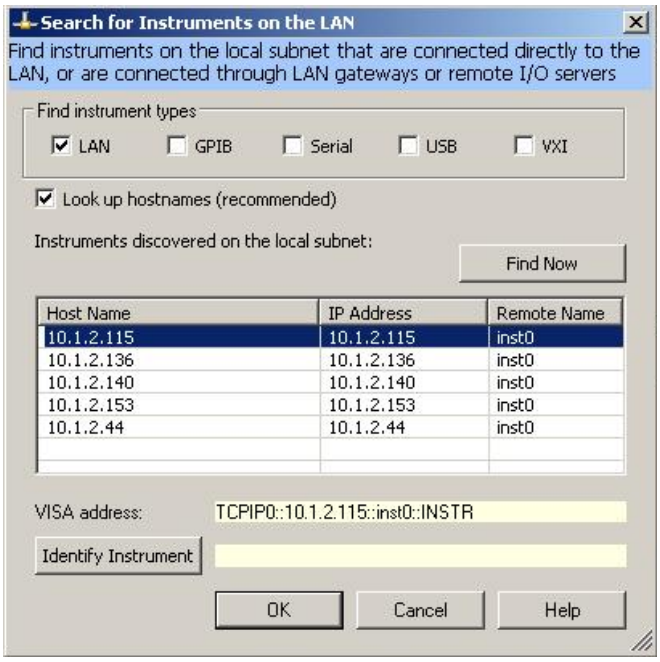

FIGURE 2-6: INSTRUMENTS DISCOVERED BY CONNECTION EXPERT

9) The instrument is now configured. Click the **OK** button (see Figure 2-7).

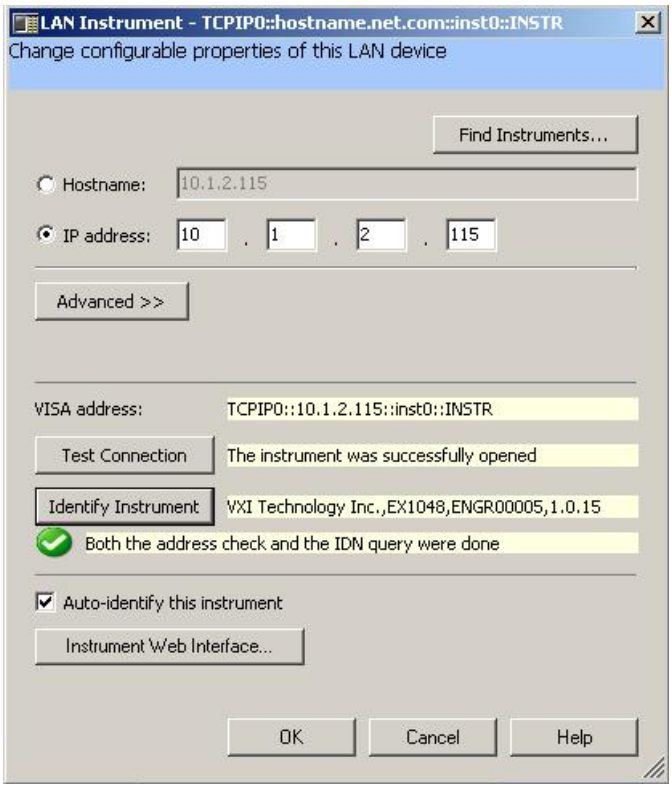

FIGURE 2-7: EX1048 DISCOVERY CONFIRMATION

10) The EX1048 is now listed as a LAN instrument. Additional instruments can be added at this time or Connection Expert can be closed (See Figure 2-8).

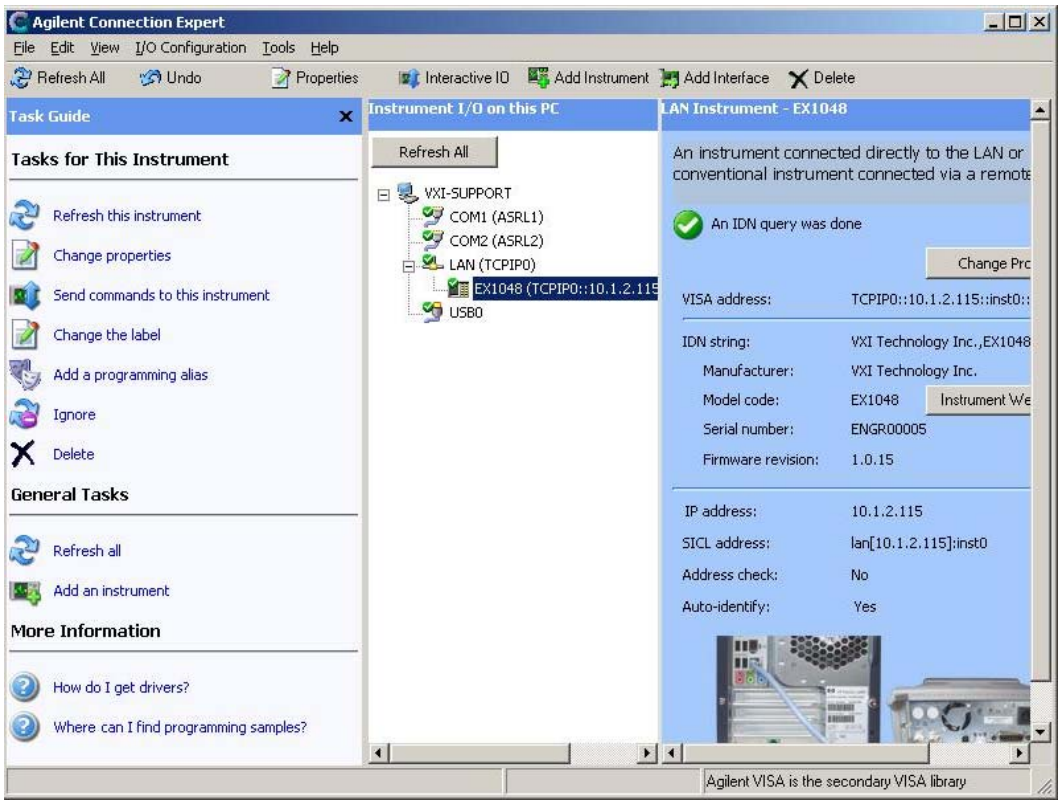

FIGURE 2-8: EX1048 DISCOVERED BY CONNECTION EXPERT

SECTION 3

DAC EXPRESS CONFIGURATION

INTRODUCTION

The contents of this section will describe how to configure and display data acquired from the EX1048 utilizing VTI Instruments's DAC Express data acquisition and recorder software.

INITIALIZING DAC EXPRESS

1) Launch DAC Express. Navigate to **Start → VT DAC Express → DAC Express** (see Figure 3-1).

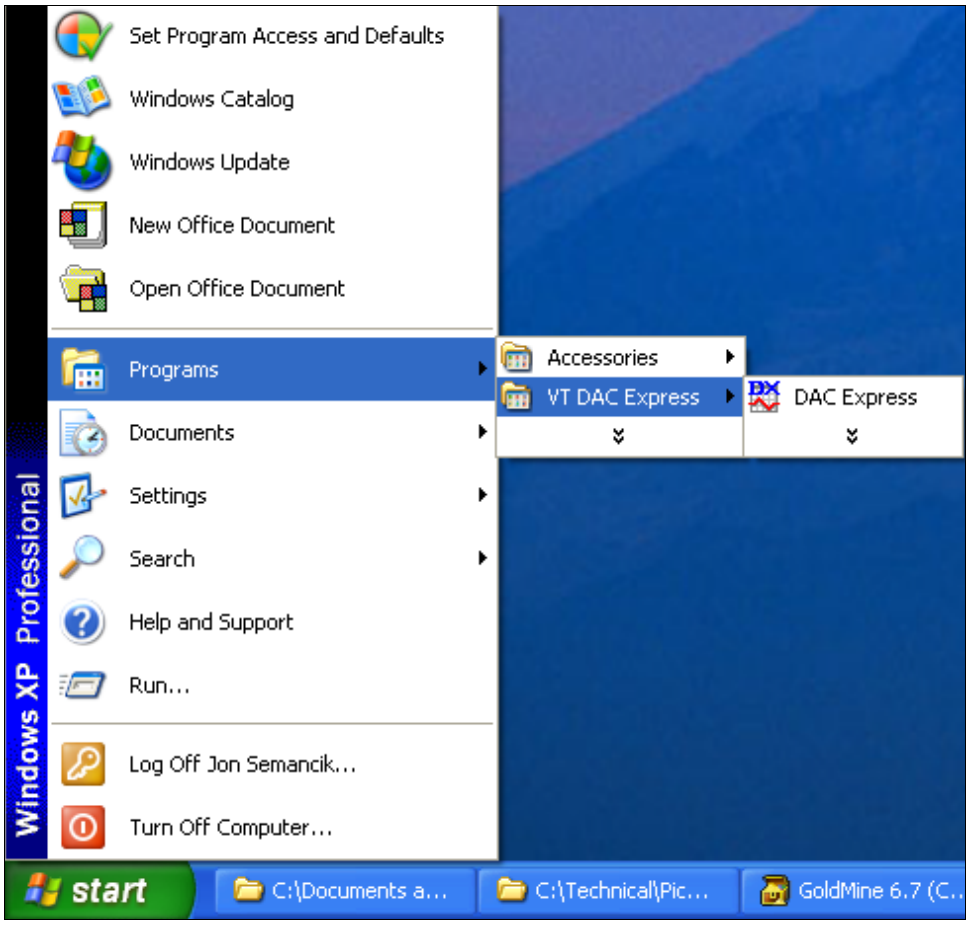

FIGURE 3-1: DAC EXPRESS NAVIGATION PATH

2) The next sequence of steps will identify the EX1048 instrument and identify it as the active instrument. First, click **Instrument → Settings** in the main menu (see Figure 3-2).

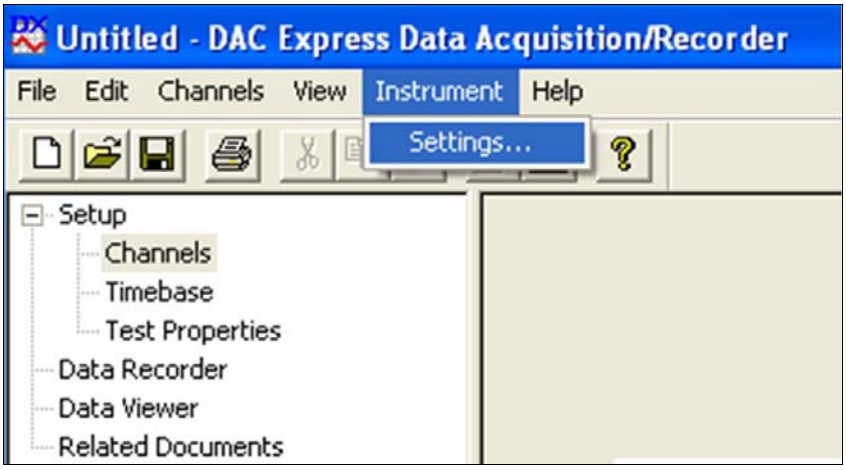

FIGURE 3-2: DAC EXPRESS INSTRUMENT SETTINGS

3) A message stating that no instruments have been configured will appear. Click on the **Add …** button (see Figure 3-3).

FIGURE 3-3: ADDING THE EX1048 TO A DAC EXPRESS PROJECT

4) The EX1048 will be displayed. Click on the **OK** button to continue (see Figure 3-4).

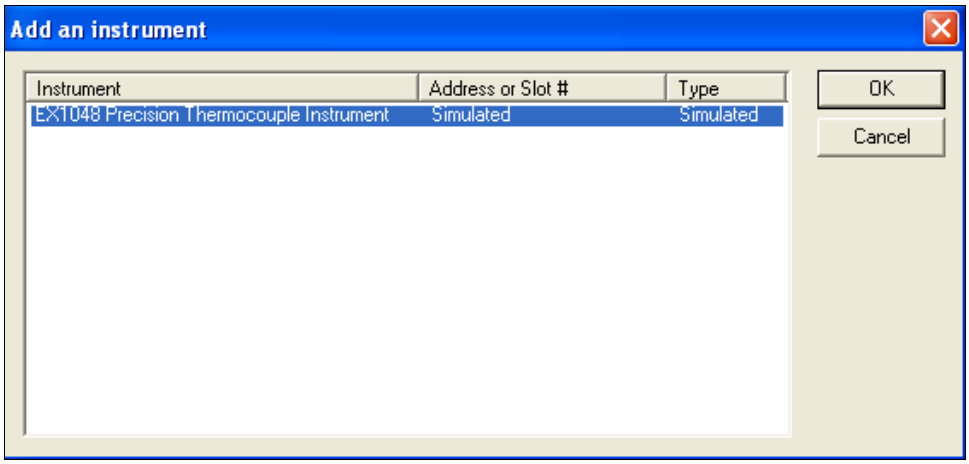

FIGURE 3-4: ADD AN INSTRUMENT DIALOGUE BOX

5) The EX1048 is now added to the project. Click on the **Close** button to continue (see Figure 3-5).

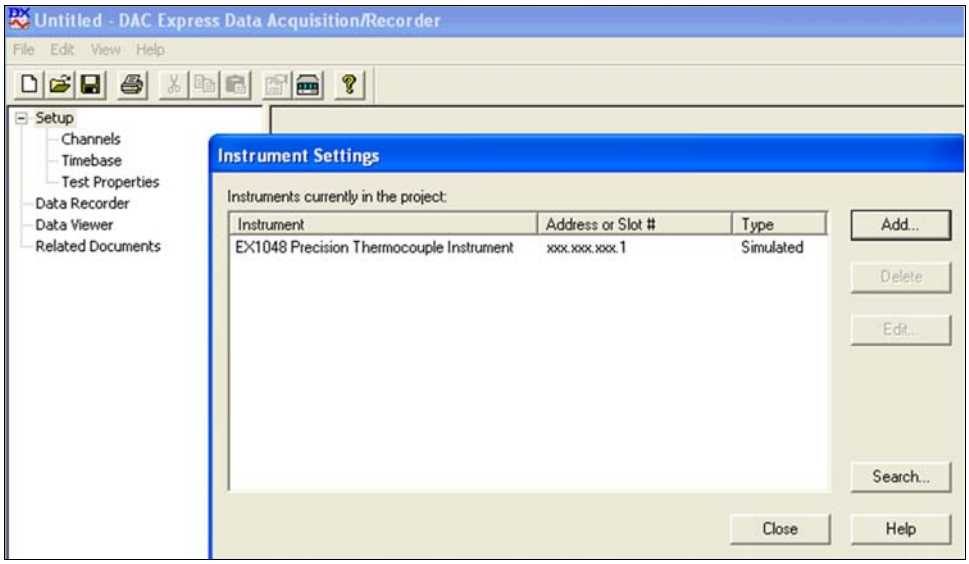

FIGURE 3-5: INSTRUMENT SETTINGS DIALOG BOX

CONFIGURING THE EX1048

1) Each individual channel can now be enabled, labeled, thermocouple type identified, EU conversion type selected, filter selected, and advanced functions defined.

   a) Click on **Channels** in the main menu.

   b) Select the desired channel by clicking on the appropriate **Enable** check box and configure the channels as needed (see Figure 3-6).

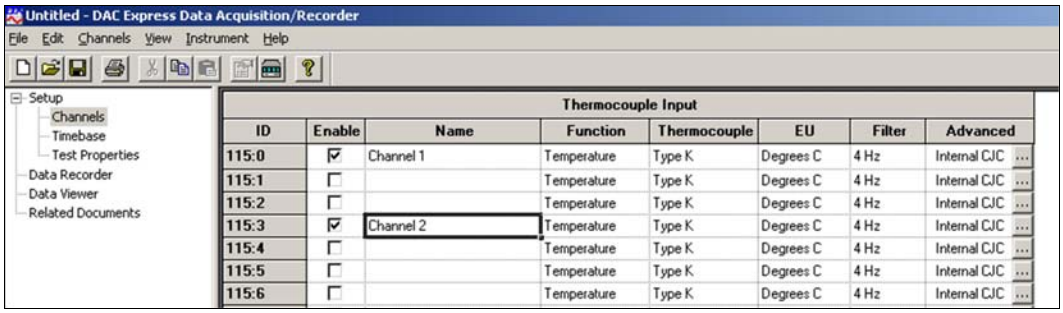
Untitled - DAC Express Data Acquisition/Recorder
File Edit Channels View Instrument Help
Setup
Channels
Timebase
Test Properties
Data Recorder
Data Viewer
Related Documents
Thermocouple Input
ID Enable Name Function Thermocouple EU Filter Advanced
115:0 Channel 1 Temperature Type K Degrees C 4 Hz Internal CJC
115:1 Temperature Type K Degrees C 4 Hz Internal CJC
115:2 Temperature Type K Degrees C 4 Hz Internal CJC
115:3 Channel 2 Temperature Type K Degrees C 4 Hz Internal CJC
115:4 Temperature Type K Degrees C 4 Hz Internal CJC
115:5 Temperature Type K Degrees C 4 Hz Internal CJC
115:6 Temperature Type K Degrees C 4 Hz Internal CJC

FIGURE 3-6: EX1048 CHANNEL CONFIGURATION

2) Next, configure the instrument's trigger, scan rate, scan period, and recording options.

   a) Click on **Timebase** in the main menu.

   b) Select the desired channel and configure appropriately (see Figure 3-7). (Default values will work well for demonstration purposes.)

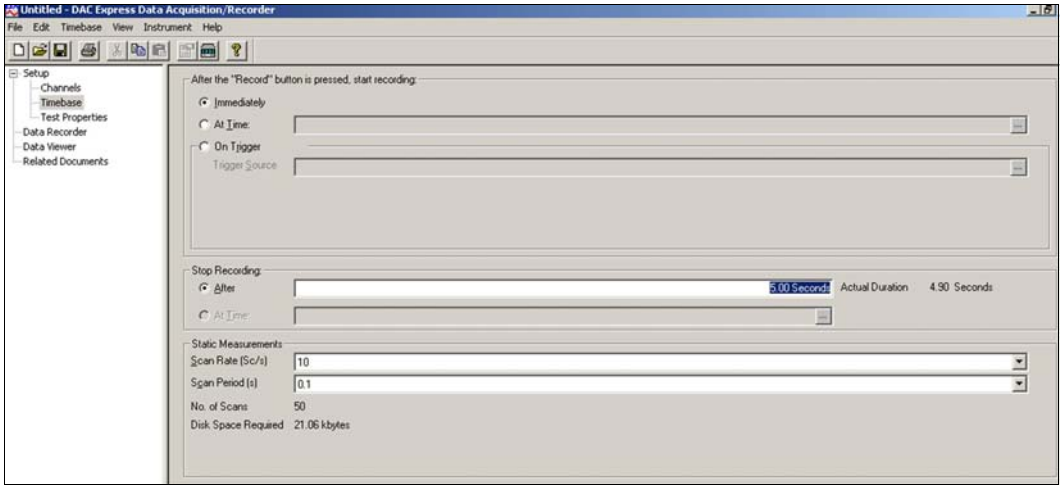

FIGURE 3-7:

3) The project properties page can now be configured.

   a) Click on **Test Properties** in the project view column.

b) Enter any data required including title, company, author, test description (see Figure 3-8).

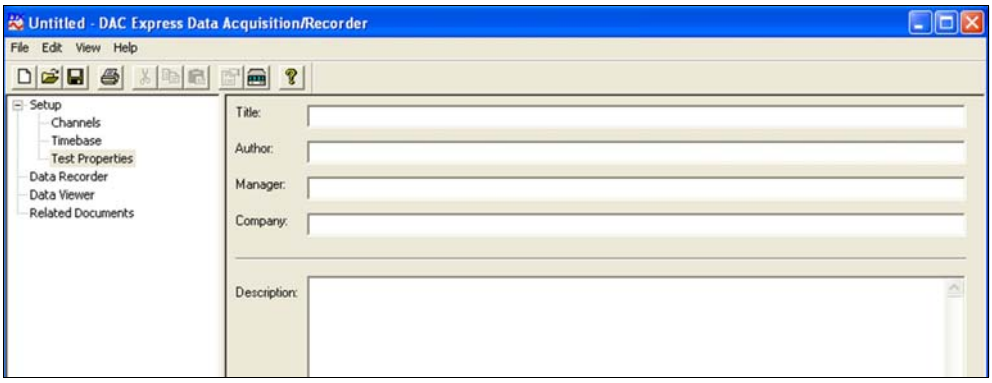

FIGURE 3-8: TEST PROPERTIES DIALOG BOX

DISPLAYING DATA

1) The instrument is now ready to begin taking and displaying data.

   a) Click on **Data Recorder** in the project view column.

   b) Next, click on the **Show Display Wizard** button (see Figure 3-9).

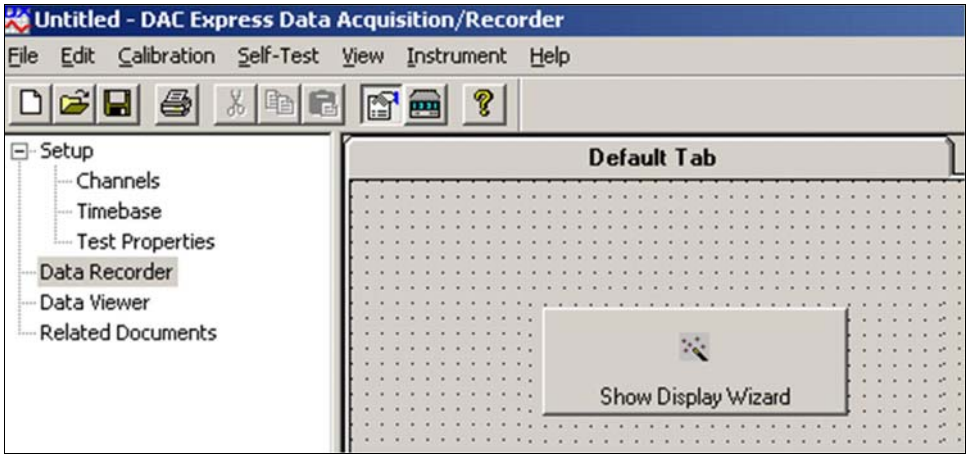

FIGURE 3-9: DATA RECORDER DISPLAY WIZARD

2) Select the desired number of channels to be displayed and click the **Next** button (see Figure 3-10).

New Display Creation Wizard
Step 1 - Choose how many channels you want on each display:
One channel per display
As many channels as each display supports
Do not automatically show this wizard in the future
Cancel
<- Prev
Next ->

FIGURE 3-10: NEW DISPLAY CREATION WIZARD WINDOW – STEP 1

3) Select the display(s) location and click the **Next** button (see Figure 3-11).

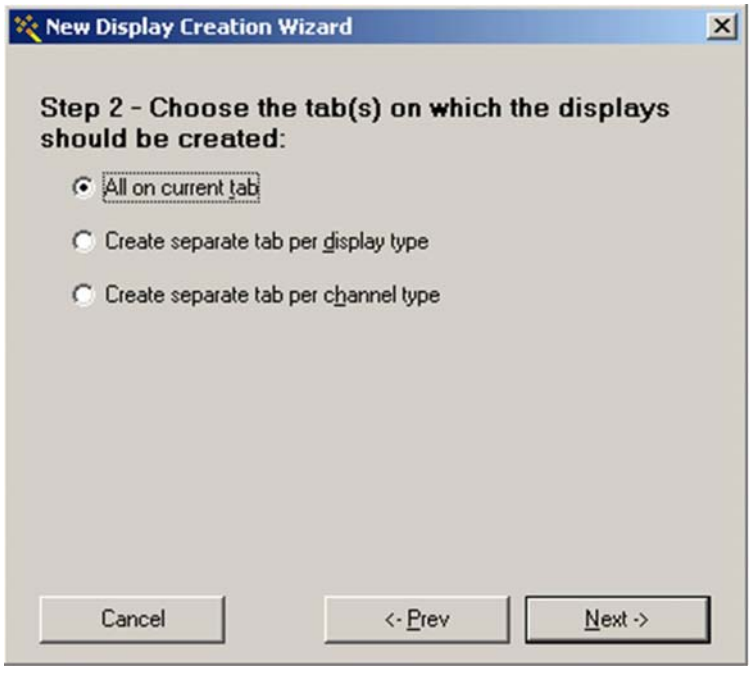
New Display Creation Wizard
Step 2 - Choose the tab(s) on which the displays should be created:
All on current tab
Create separate tab per display type
Create separate tab per channel type
Cancel
<- Prev
Next ->

FIGURE 3-11: NEW DISPLAY CREATION WIZARD WINDOW – STEP 2

4) Select the channels to be displayed and click **Next** button (see Figure 3-12).

FIGURE 3-12: NEW DISPLAY CREATION WIZARD WINDOW – STEP 3

5) Select the type of graph and click the **Create Displays** button (see Figure 3-13).

FIGURE 3-13: NEW DISPLAY CREATION WIZARD WINDOW – STEP 4

6) The selected display type will now be shown with the data (see Figure 3-14).

a) Begin recording data to disk by clicking on the red record button.

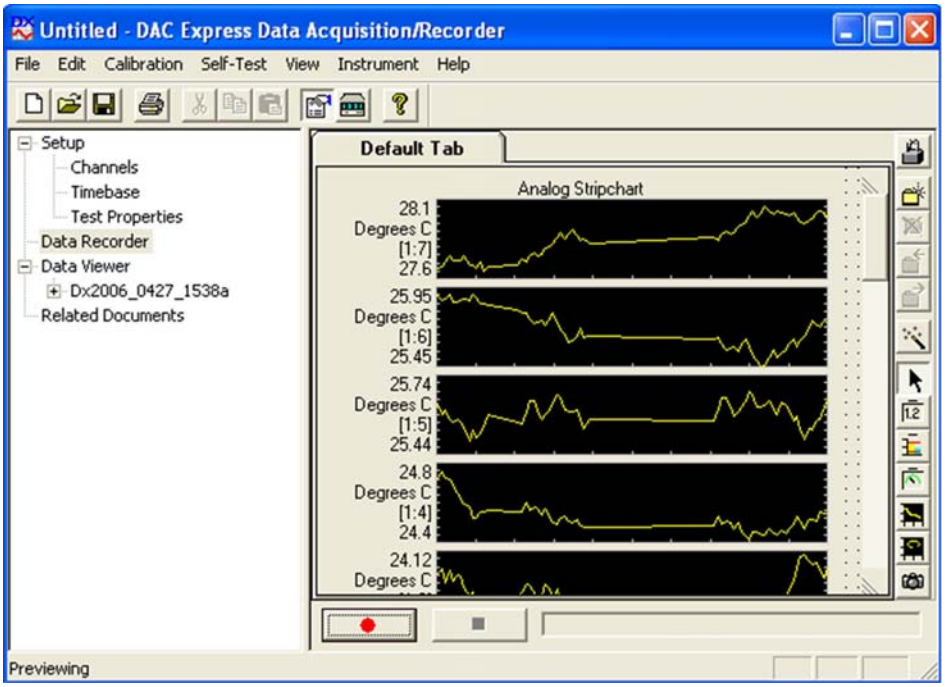

FIGURE 3-14: DATA DISPLAY

SECTION 4

TCP/IP CONFIGURATION

SUMMARY

By default, the EX1048 will attempt to locate a DHCP server. If a DHCP server is found, the IP address assigned by the DHCP server will be assumed. Otherwise, after a timeout of 20 seconds, the unit will attempt to obtain an IP address by using AutoIP.

AutoIP is a mechanism for finding an unused IP address in the range 169.254.X.Y, where X is in the range 1 - 254 and Y is in the range 0 - 255. The device will first attempt to obtain the specific address 169.254.X.Y, where X and Y are the second-to-last and last octets of the device's MAC address. However, X will be set to 1 if it is 0 in the MAC address, and to 254 if it is 255 in the MAC address. If this address is already in use, the unit will attempt to obtain other IP addresses in a pseudorandom fashion until it finds one that is available.

If a static IP address assignment is preferred, one can be optionally assigned via the embedded web page interface. This is done by clicking the **Network Configuration** link found in the EX1048 embedded web page, disabling DHCP, and then assigning a static IP address. For more information, see *Network Configuration* in Section 5 of the *EX1048 User's Manual*.

However, a much more convenient, and recommended, way to obtain the benefits of a static IP address is to employ DHCP, but assign the instrument a reserved IP address in your company's DHCP server configuration. This reserved address, linked to the EX1048's MAC address on the DHCP server, would be assigned to the EX1048 at power up initialization without having to manually set it on the EX1048. The DHCP server configuration provides a centralized, controlled database of assigned IP addresses, preventing accidental assignment of the same IP address to multiple instruments. Consult your company's Information Technology department for assistance.

VXI-11 Device Discovery is also supported by the EX1048. This allows all EX1048s on a local network to be found without knowledge of their MAC address or IP address with the use of a broadcast message.

TCP/IP CONFIGURATION METHODS

Option 1- Dynamic Host Configuration Protocol (DHCP)

Initially, the EX1048 is configured with DHCP enabled. When it is connected to a network that has a DCHP server, it will automatically receive an IP address from the server. It is recommended to configure the DHCP server to assign the IP address based on the MAC address of the EX1048. This will ensure that the EX1048's IP address is known. The EX1048 supports VXI-11 Device Discovery so, if the IP address is not known, it may still be located by a computer on the same network.

Option 2 – Auto IP

Auto IP is a mechanism for finding an unused IP address in the range 169.254.X.Y where X is in the range 1 - 254 and Y is in the range 0 - 255. The device will first attempt to obtain the specific address 169.254.X.Y, where X and Y are the second-to-last and last octets of the device's MAC address. However, X will be set to **1** if it is **0** in the MAC address, and to **254** if it is **255** in the MAC address. If this address is already in use, the unit will attempt to obtain other IP addresses in a pseudorandom fashion until it finds one that is available. To illustrate the AutoIP mechanism, Table 4-1 lists the AutoIP default address for some example MAC addresses.

MAC Address	Auto IP Default Address
00:0D:3F:01:00:01	169.254.1.1
00:0D:3F:01:01:01	169.254.1.1
00:0D:3F:01:A3:28	169.254.163.40
00:0D:3F:01:FE:FE	169.254.254.254
00:0D:3F:01:FF:FE	169.254.254.254

TABLE 4-1 AUTO IP DEFAULT ADDRESS ASSIGNMENT

Option 3 – Static IP

If a static IP address assignment is preferred, one can be optionally assigned via the embedded web page interface. This may be done using the following procedure:

1) First, click on the **Network Configuration** link on the left side of the EX1048 main page.

2) Make sure that the "DHCP" and the "Auto IP" boxes are unchecked.

3) Make sure that the "Static IP" box is checked.

4) Enter the appropriate network configuration information in the section labeled "Static IP Configuration".

5) Click the "Submit" button.